Square-wave voltammetric determination of primaquine in urine using a multi-walled carbon nanotube modified electrode

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Abstract

The electrochemical process involving primaquine was studied at a glassy carbon (GC) electrode modified with multi-walled carbon nanotubes (MWCNT). The GC/MWCNTs electrode promoted an intense oxidation peak for primaquine, improving signal when compared to the one observed using bare GC as electrode. Besides the increasing in active electrode area, the MWCNTs seemed to provide faster electron transfer. The linear analytical response for primaquine, in the concentration range from 0.1 to 5.0 μmol L−1, was achieved on a supporting electrolyte consisting of Britton-Robinson buffer (0.02 mol L−1; pH 7.00) and KCl (0.25 mol L−1). The quantitative assay using square-wave voltammetry was performed by successive additions of standard into the electrochemical cell, containing the sample, with instrumental limit of detection (LOD) of 7.3 μg L−1 (28 nmol L−1). A procedure involving liquid-liquid extraction and thin-layer chromatography provided selectivity and pre-concentration required for the determination of traces of primaquine in urine samples (LOD of the method of 146 ng L−1). Recoveries in urine samples were statistically similar to the one achieved by HPLC.

Keywords Primaquine; Glassy carbon electrode; Multi-walled carbon nanotubes; Human urine